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Methods Used for Fecundity Estimation of Rockfish and Lingcod Ovaries

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ABSTRACT

Richards, L. J. and B. Emmett. 1988. Methods used for fecundity estimation of rockfish and lingcod ovaries. Can. Data Rep. Fish. Aquat. Sci. 707: 44 p.

This report summarizes the results of a contract to estimate fecundity and oocyte size distribution from ovaries of quillback rockfish (Sebastes maliger), copper rockfish (S. caurinus) and lingcod (Ophiodon elongatus). Rockfish ovaries were collected from commercial rockfish handline fisheries in British Columbia statistical areas 13 and 17 in January 1986. Lingcod ovaries were collected from a commercial lingcod vessel in statistical area 17 in November 1985 and January 1986. A total of 340 ovary samples were processed: 272 quillback rockfish, 21 copper rockfish and 47 lingcod. Descriptions of the processing methodology and sample data on wet weight, oocyte number and oocyte size are presented in this report.

RÉSUMÉ

Richards, L. J. and B. Emmett. 1988. Methods used for fecundity estimation of rockfish and lingcod ovaries. Can. Data Rep. Fish. Aquat. Sci. 707: 44 p.

Le présent rapport résume les résultats d'un contrat visant à estimer la fécondité et la répartition de la taille des oocytes provenant d'ovaires de sébaste à dos épineux (Sebastes maliger), de sébaste cuivré (S. caurinus) et de morue-lingue (Ophiodon elongatus). Les ovaires de scorpènes ont été recueillis dans le cadre de la pêche commerciale des scorpènes à la ligne à main en janvier 1986 dans les secteurs statistiques 13 et 17 de la Colombie-Britannique. Les ovaires de morue-lingue ont été recueillis à partir d'un bateau de pêche commerciale de la morue-lingue dans le secteur statistique 17 en novembre 1985 et en janvier 1986. On a traité en tout 340 échantillons d'ovaire: 272 de sébaste à dos épineux, 21 de sébaste cuivré et 47 de morue-lingue. Les auteurs présentent dans ce rapport des descriptions des méthodes de traitement et des données-échantillons sur le poids humide, le nombre et la taille des oocytes.

INTRODUCTION

This report summarizes the results of a contract completed by Archipelago Marine Research of Victoria, British Columbia. The purpose of the contract was to estimate fecundity and oocyte size distribution for ovaries of three species: quillback rockfish (Sebastes maliger), copper rockfish (S. caurinus) and lingcod (Ophiodon elongatus). Descriptions of methodology and sample data on wet weight, oocyte number and oocyte size are presented in this report.

METHODS

SAMPLE COLLECTION

Rockfish ovaries were collected from commercial rockfish handline fisheries near Campbell River (British Columbia statistical area 13) and Porlier Pass (statistical area 17) in January 1986. Lingcod ovaries were collected from a lingcod hook and line survey in statistical area 17 in November 1985 (Cass and Richards 1987). Samples were supplemented in January 1986 by one day of commercial fishing near Porlier Pass aboard the F/V BLACK HEART, the vessel that had been chartered for the lingcod survey. Fish sample numbers used to identify species and areas are listed in Table 1.

Rockfish and lingcod were measured for length to the nearest mm and for weight to the nearest g. Ovaries were removed from mature females, weighed to the nearest g and preserved in Gilson's (1897) fluid. This fluid is composed of equal volumes of chloroform, glacial acetic acid and ethanol, and helps to liberate the oocytes from the surrounding connective tissue. Because of the larger size of lingcod ovaries, some of the ovaries were preserved in two jars.

SAMPLE PROCESSING

Ovary samples were examined between December 1986-March 1987. For each sample, the Gilson's fluid was drained into a storage container and the ovary retained on a coarse sieve that was positioned over a fine sieve. The sample was washed thoroughly with a fine spray of cold, fresh water and the ovary gently broken apart. The oocytes were separated from the surrounding connective tissue and collected on the fine sieve. Sieves were made from 1125 and 116 µm Nitex screening for rockfish ovaries and 2800 and 602 µm Nitex screening for lingcod ovaries.

Ovary samples were vacuum filtered at approximately 15 psi with a Buchner funnel and Whatman #1 filter paper. Filtering continued until the oocytes took on the consistency of cornmeal and the time between water drops was approximately 15 sec. For larger samples this could require 10-15 min. Oocytes could not be easily scraped from the filter, and the oocytes and filter were weighed together to within 0.01 g. The mean weight of ten filter papers, through which water had been filtered, was used as a standard tare to obtain total oocyte weight. Mean weights were estimated for each new box of filter papers that was used.

Four subsamples of approximately 500 oocytes were taken from each ovary sample. The subsamples were placed in pre-weighed aluminum dishes and weighed to within 0.0001 g. The four 500-oocyte subsamples were washed into chambers and counted under a dissecting microscope at 80 power. One subsample, chosen at random, was recounted as an accuracy check. If the difference between the two counts was greater than 2%, the subsample was counted a third time.

Diameters of oocytes in the recounted subsample were measured with an ocular micrometer. To obtain a replicate count, two sections of the counting chamber were selected and 40 oocytes were measured in each section. If the oocytes were asymmetrical in shape, the modal diameter was measured.

After processing, each ovary sample was returned to its original jar and stored in 10% formalin.

RESULTS AND DISCUSSION

A total of 340 ovary samples were processed: 272 quillback rockfish, 21 copper rockfish and 47 lingcod. Lingcod ovaries that had been preserved in two jars were treated as two samples. Sixteen of the quillback rockfish ovaries were not processed. These ovaries were small and could not be completely separated from the surrounding connective tissue. Data on ovary weight and corresponding oocyte counts for each ovary sample are presented in Appendix Table 1.

Oocyte size distributions from each ovary sample are shown in Appendix Table 2. For presentation, ocular diameter measurements were converted to mm. The two subsamples from each ovary have essentially identical oocyte size distributions, and the subsamples are combined in the table. Oocyte diameter is similar for copper and quillback rockfish and ranges from about 0.4-1.0 mm. Oocyte diameter is more variable for lingcod and ranges from 0.4-3.0 mm.

Samples were processed at an average rate of 4.7 samples per person-day over the contract period. The time required to complete one sample ranged from 40-90 min depending on the fish species, size of ovary and oocytes, and ease of sample preparation. Sample preparation usually required less than 10 min and most of the processing time was required for counting and measuring oocytes. The larger lingcod ovaries were the easiest to prepare and count.

ACKNOWLEDGMENTS

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LITERATURE CITED

Cass, A. J. and L. J. Richards. 1987. Lingcod hook and line survey in the Gulf Island region (statistical area 17) of the Strait of Georgia, October-December 1985. Can. MS Rep. Fish. Aquat. Sci. 1934: 65 p.

Table 1. Sample numbers for each species by statistical area and collection date.

Species	Area	Date	Sample numbers
quillback	13	Jan. 86	7361-7746
quillback	17	Jan. 86	7061-7327
copper	13	Jan. 86	7823-7838
copper	17	Jan. 86	7801-7821
lingcod	17	Nov. 85	40266-40520
lingcod	17	Jan. 86	40540-40564

Appendix Table 1 and 2 do not appear in paper, but appear in microfiche form at tne back of this report.